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THE SOCIOECONOMIC IMPACT OF REGULATION OF HAZARDOUS WASTE

Ann E. Stanley
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Research, Development, and Engineering Center

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U.S. ARMY MISSILE COMMAND

Redstone Arsenal, Alabama 35898-5000

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<p>The socioeconomic impact of regulations such as the Resource Conservation and Recovery Act (RCRA) on the hazardous waste business is discussed. The legal requirements of RCRA are adequately reflected in several appropriate Army and local regulations. The hazardous waste industry has grown from a total of \$5.8 billion and eleven segments in 1977 to a projected \$74.9 billion in twelve segments in 1993. It is projected that if this growth rate remains the same, the total sales will reach \$121.2 billion in the year 2000. This growth rate is predominantly regulation-driven. It is clear that the current emphasis in court rulings is on individual liability, which creates a frightening environment for the individual worker and manager. This publication was written as a part of the requirements of a course entitled "Economic Impact of Regulation."</p>					
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I. INTRODUCTION

Although the evolution of regulations governing environmental protection dates back to the 1890s in the United States (U.S.), it was Rachel Carson's book, *Silent Spring*, which catalyzed public concern at the national level in the early 1960s. Her book focused on pesticides and their potential for inadvertent detrimental effects in the environment. Stimulated by incidents such as the Love Canal, public consciousness about environmental issues such as the disposal of industrial hazardous waste, multiplied. In 1973-74, there were the energy and materials "crises" which led to increased concern with resource conservation and recycling. The energy crisis generated concern about the efficient use of natural resources, especially those of significance to the economy and national defense of the U.S. Ultimately, these two forces prompted Congress to pass the Resource Conservation and Recovery Act (RCRA) of 1976 and other environmental laws in the late 1970s and 1980s.

Prior to the passage of RCRA, the U.S. had much regulation in place to protect both the environment and human health. On the state level, the states struggled with varying success to control industrial waste. Faced with 50 different state laws, industry pleaded for uniformity of the codes. Thus, the RCRA, which was passed in 1976, is the law which governs areas such as the management of hazardous waste, underground storage tanks, recovery of resources and energy from waste, the disposal of nonhazardous solid waste, and protection of groundwater resources.

This new law was significant. Wastes were delineated. A "cradle-to-grave" paper trail of responsibility and liability was created. A system was set up for issuance of permits for treatment storage and disposal of hazardous waste. The Environmental Protection Agency (EPA) was identified as the agency to control pollution. EPA issued statutes in 1980 just before the expiration of RCRA. In 1980, Congress made only minor modifications and technical amendments which related to the coordination of RCRA with other laws.

In 1984, a different aura pervaded Congress; thus major extensive and substantial revisions were made to the law. The present rendition is now very different and quite complex. This is due to disagreement between Congress and the White House Administration. RCRA expired in 1988, but is still in place through extensions and continuing resolutions until renewal.

II. GOVERNMENT

One of the new stances which now prevails is that these regulations, along with many other Federal laws, are now applicable in government agencies and to government employees. Fundamentally, federal agencies are no longer exempt from the laws which private industry is required to follow. This includes the Department of Defense (DoD).

Secretary of the Defense, Cheney, challenged the Services, particularly the Army, to clean up and set an example for all America. Unfortunately, while private industry is showing progress in cleaning up pollution problems, the military is behind schedule [2, 3]. Today's military pollution problems are the direct result of many decades of unchecked and unhealthy hazardous waste disposal methods [3]. Very few military bases' hazardous wastes have been cleaned, despite a decade of studies and a multibillion dollar Pentagon program.

III. LANDMARK LEGISLATION: THE ABERDEEN CASE

As a result of this new interpretation of federal legislation, three civilian managers at Aberdeen Proving Ground were tried and convicted of the illegal storage and disposal of chemicals. This was the first-ever criminal conviction of U.S. Government employees for hazardous waste violation under RCRA. This case was scrutinized closely by government officials and environmentalists as a test of whether government workers can be held criminally liable for violating environmental laws on federal property. Their conviction clearly answers this question for all interested parties [4-7].

IV. RCRA, 1976

RCRA of 1976, as amended, has the following full title and purpose:

AN ACT – To provide technical and financial assistance for the development of management plans and facilities for the recovery of energy and other resources from discarded materials, and to regulate the management of hazardous waste [1].

RCRA is the short title for Title II of chapter 42 of the United States Code (42 USC.6905 and following). The full, proper title is Title II – Solid Waste Disposal.

Amendments added in 1984 established the principal objective of the law to be the appropriate management of hazardous waste. These amendments established the national policy on hazardous waste. Section 1003 states:

- (a) *Objectives. – The objectives of this act are to promote the protection of health and the environment and to conserve valuable material and energy resources by:*
 - (1) *assuring that hazardous waste management practices are conducted in a manner which protects human health and the environment;*
 - (2) *requiring that hazardous waste be properly managed in the first instance, thereby, reducing the need for corrective action at a future date; and*
 - (3) *minimizing the generation of hazardous waste and the land disposal of hazardous waste by encouraging process substitution, materials recovery, properly conducted recycling and reuse, and treatment.*
- (b) *NATIONAL POLICY. – The Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment [1].*

The subtitles which make up the major divisions of the law are:

Subtitle A: General Provisions

Subtitle B: Office of Solid Waste: Authorities of the Administrator

Subtitle C: Hazardous Waste Management

Subtitle D: State or Regional Solid Waste Plans

Subtitle E: Duties of the Secretary of Commerce in Resource Conservation and Recovery

Subtitle F: Federal Responsibilities

Subtitle G: Miscellaneous Provisions

Subtitle H: Research, Development, Demonstration, and Information

Subtitle I: Regulation of Underground Storage Tanks

Subtitle J: Demonstration of Medical Waste Tracking Program

Because of the extensive nature of RCRA, this report will focus on Subtitle C; Hazardous Waste Management, as enforced in the Army.

A. Hazardous Waste Management

All regulations issued by the EPA are in Title 40 of the Code of Federal Regulations (CFR). The entitlement of Title 40 is Protection of the Environment. Chapter I of Title 40 is Environmental Protection Agency. Chapter V describes the Council on Environmental Quality.

RCRA focuses attention on the generator, who is responsible for the proper management of the waste as long as it is hazardous, that is, from generation to ultimate disposal. This responsibility extends to ensuring that the transporter and treatment facility can handle and treat the waste without the release of hazardous wastes to the environment. RCRA itself does not specify this; it is contained in the Comprehensive Response, Compensation and Liability Act (CERCLA), also known as the Superfund law. The generator, along with the transporter and/or disposal facility owner, share liability for costs. Liability cannot be transferred by contract. It is clear that the generators are bearing most of the cost of site remediation.

There is limited defense for the generator. He must establish that any damages were the result of: an act of God, an act of war, or an act of omission by a third party. He also must establish that he exercised due care regarding the hazardous substance involved and its management, and he took precautions against any foreseeable acts or omissions by the third party, and against the consequences of those acts or omissions. Clearly, RCRA and Superfund laws want generators to generate and transfer waste cautiously.

B. Liability

RCRA sets forth three types of penalties for improper management of hazardous waste. States are required to have similar or more stringent laws. RCRA is concerned with the behavior of any individual or entity which generates, transports, and/or stores hazardous waste. Under RCRA, the administrator can charge those who knowingly: (1) transport or cause the transportation of hazardous waste to an unpermitted facility, (2) treat, store, or dispose of hazardous wastes without a permit, or in a manner which violates a permit, (3) leave out information or misrepresent any document or record, (4) destroy, change, or fail to file any report or record, (5) transport hazardous wastes lacking a manifest, (6) export hazardous wastes to a foreign country in violation of an international agreement, or (7) dispose of used oil in violation of RCRA. Criminal penalties can involve fines of \$50,000/day of violation and imprisonment for up to two years. Both the fine and prison term double for the second offense. If any person knowingly endangers another person in violation of RCRA by placing another in danger of death or bodily injury, he is liable for a fine of up to \$250,000 and a prison term of up to 15 years.

RCRA defines person as including an individual, corporation, partnership, trust, firm, association, municipality, state, or political subdivision. RCRA imposes liability on employees, foremen, managers, operators, and owners of businesses involved in the generation and transportation of hazardous wastes. Thus, while it appears there are protections associated with the knowingly requirement, all participants in these operations can face criminal liability.

Civil liability can be imposed against any person who violates any permit, standard, regulation, or order issued under RCRA. The administrator of EPA can impose civil penalties of up to \$25,000 per day. Alternatively, citizen suits to enforce RCRA can result in awards of fees and expenses to the winner, although there is no private avenue for damages under RCRA.

Superfund provides funds and enforcement authority for cleaning up hazardous waste dump sites. It is applicable to old sites where operations have ceased. The EPA may act whenever there is an actual release, or threat of release, of a hazardous substance from such a site. The costs of remediation are collected from past and current owners, operators of such sites, transporters, and generators of the wastes. As with other statutes, persons include individuals, firms, corporations, associations, partnerships, states, municipalities, and other commercial entities. Under this provision, the president and principal shareholders of a corporation are responsible for remediation cost. In order to hold a shareholder liable, the agency must show that the shareholder participates in management. Liability includes the total cost of remediation and damages; however, if the person fails to properly remediate, he may be liable for punitive damages (not to exceed three times the cost). Civil penalties as high as \$25,000 per violation may be assessed for specific behavior resulting in destruction of records, notice of release, and other violations. The second time offender faces up to \$75,000 per day civil penalties.

The status of current State and Federal environmental laws clearly indicates society's growing concern over our environment. The corporate firm no longer serves as a shield to the individual officers, directors, and employees; rather, they face substantial civil penalties and criminal liability.

C. Definition/Constraints

EPA defines hazardous waste and its hazardous characteristics. Waste codes are assigned to each waste that is listed. This code is a letter plus three numbers. The letter indicates whether the waste has hazardous characteristics or is a listed waste. The number indicates the specific characteristic or a specific entry on a list.

EPA also assigns hazard codes to each waste. This hazard code identifies the specific hazard associated with a waste. The codes are: I for ignitable; C for corrosive; R for reactive; E for EP toxic; H for acute hazardous; and T for toxic. A waste may have more than one hazard code. RCRA defines the techniques for measurement of these characteristics, as well as management techniques for spills, containers, storage, and disposal.

RCRA defines a set of rules which apply to generators. These rules allow for accumulation of waste near the point of generation. There are strict Department of Transportation (DoT) rules which govern the subsequent transportation, labeling, packaging, and packing of hazardous wastes to be shipped. The keystone of the hazardous waste management program is the manifest. The generator, transporter, and TSD facilities are all required to sign and maintain copies of the manifest as a record of shipment. The amount of waste to be accumulated is regulated. The generator is required to use proper marking, dating, and containers, and is required to be prepared for and prevent, emergency conditions. It is necessary to have contingency plans and emergency response systems.

In the 1984 amendments to RCRA, Congress fully intended to halt the land disposal of hazardous wastes, except for the residues from the very best available treatment disposal processes. For this reason, the land ban restrictions equal the tax laws in complexity. These bans are also on a very tight schedule. Additionally, these regulations change almost continually adding to the confusion of American industry.

V. THE ARMY REGULATIONS (MICOMR)

The goal of the Army's environmental program is the attainment and compliance to the maximum extent possible as related to the mission of the U.S. Army. Mitigation of environmental conditions to the maximum extent practical is an absolute requirement. Complete abatement of such conditions is desired and is to be pursued by all Army activities. The Army's emphasis is on waste minimization and recycling. An important part of compliance with the environmental regulations and recycling is played by the Defense Reutilization and Marketing Office (DRMO) located in Huntsville, Alabama.

A. MICOM Regulation No. 420-5: Prevention, Control, and Abatement of Air, Water, and Ground Pollution

MICOM regulation 420-5 establishes policy and responsibilities for the control and disposal of industrial, domestic, vehicular equipment, and other waste materials to prevent the pollution of grounds, bodies of water, streams, and air. It applies to the U.S. Army Missile Command, several other activities, government-owned contractors, government tenants, and organizations on the installation.

Pollution is defined as:

Materials, chemicals, substances, noise, heat, or any product other than electromagnetic radiation, which is released into the soil, storm drains, streams or bodies of water, or air, to the extent that it will be harmful to humans, livestock, aquatic life, game, wildlife, or vegetation [8].

Disposal is defined as:

Method utilized to burn, neutralize, dilute, bury, or treat to conform with established standards of the State of Alabama or the Federal Government, whichever is more stringent [8].

This regulation requires that effective control be maintained over the release of any such pollutants.

Any new systems designed must have environmental impact statements as a part of their design. Standing Operating Procedures (SOPs) must be established. Such SOPs are reviewed by an environmental coordinator, while the U.S. Army Corps of Engineers is responsible for requiring industrial plants to comply with environmental quality standards (AR 405-80).

The goal of this environmental program is the attainment and compliance to the maximum extent possible as related to the mission of the U.S. Army Missile Command. Mitigation of an environmental condition to the maximum extent practical is an absolute requirement. Complete abatement of such conditions is preferred and will be pursued by all MICOM activities.

B. MICOM Regulation No. 420-7: Solid Waste Management for Recyclable Materials

This regulation contains a statement of policy for a Solid Waste Management Plan as required by the Army. It assigns responsibilities and the procedures for disposal of solid waste. The underlying principle contained within this regulation is that solid waste will be recycled to the maximum extent possible. Solid waste includes: garbage, refuse, sludge, waste (not domestic sewage), waste mixed with domestic sewage, industrial waste, irrigation water returns, nuclear materials, and in situ mining techniques.

Additionally, solid waste generation will be minimized and segregated at the source, wherever possible. Any contracts let for handling solid waste must include the requirements of this regulation. All processes such as the design, procurement, and utilization of materials are required to be done in a manner which minimizes solid waste. Organizations will exhibit cooperation with any beneficial recycling program in the community. Recyclable materials may not be disposed of in sanitary landfills. Scavenging by unauthorized personnel is forbidden.

C. MICOM Regulation No. 200-1: Asbestos Control Program

This regulation deals with the policies, responsibilities and disposal of asbestos-containing materials. It is the intent of the regulation to limit the exposure of personnel to the asbestos hazard. Asbestos at MICOM is most commonly found as pipe insulation and insulation in boiler plants. This material is presently being carefully removed from the buildings at MICOM by contractors.

MICOM has already identified the majority of asbestos in its buildings by sampling and analysis. Line drawings are used to indicate the presence of asbestos. Any worker who comes upon asbestos in the course of his work is supposed to stop until the material is identified and appropriate steps are taken to properly remove and dispose of the asbestos.

D. MICOM Regulation No. 200-2: Hazardous Waste Management Program

This is the prime MICOM regulation which imposes RCRA. It establishes a Hazardous Waste Management Program in accordance with RCRA and Alabama law. Under this regulation all hazardous waste generated on Redstone Arsenal, regardless of quantity, is to be properly recovered, recycled, reused, containerized, stored, treated, and disposed of in accordance with applicable federal and state regulations. The quantities of hazardous waste produced are to be reduced to the maximum extent possible. Recycling and reuse are to be used as much as possible. Hazardous waste is to be segregated into separate containers to the maximum possible extent to prevent mixing incompatible materials and to enhance the recycling program. Radioactive material is dealt with in a special, specified manner.

The waste generator must make every attempt to store or dispose of his hazardous waste through established procedures. The MICOM Environmental Officer accepts hazardous waste for disposal only after every other avenue has been exhausted. This includes the attempt to return the material to the original manufacturer. All chemicals turned in to the DRMO must be designated as hazardous on the turn-in document. The waste is containerized in DoT approved containers for turn-in to DRMO. All contracts must contain the requirements stated within this regulation to be imposed on contractors.

E. DRMO-Huntsville

The DRMO, Huntsville, Alabama, with regional headquarters located in Memphis, Tennessee, is an element of the Defense Logistics Agency, whose primary mission is the reutilization or reassignment of military property. Their goal is to avoid the expense of purchasing new items if useable equivalent items are available. Only after excess property is screened against the military services' needs, other federal agency needs, state and local government needs, and the needs of approved non-profit organizations, is it declared to be surplus to the needs of the government, and offered at public sale. DRMO also operates the DoD Precious Metals Recovery Program. Gold, silver, and platinum family metals are recovered, refined through civilian contracts, and placed in storage for reissue to contractors on new military purchases. As of October 1, 1980, DRMO is the manager for disposal of hazardous and toxic materials, excluding nuclear wastes. As many materials as possible are reused within DoD or sold. Other hazardous materials are disposed of in an environmentally acceptable manner, in accordance with all federal, state and local regulations. Ultimately, hazardous wastes are disposed of by private businesses through contracts which are awarded to responsive and responsible contractors, as defined by the Defense Acquisition Regulations, and who have EPS permits for their dump sites. A DRMO employee is always on site for pickup of the wastes, and actual disposal is monitored through the manifest system established by the Environmental Protection Agency, and on-site spot checks [9].

VI. THE BUSINESS

Over the past ten years, concern about improper disposal techniques used in the past has manifested itself in the passage of disposal and control legislation of unprecedented scope. This legislation is significantly impacting the way waste is managed and has caused tremendous growth in the hazardous treatment business. The treatment of hazardous waste business (Hazwaste) is growing at an incredible rate [10, 11] (Table 1). The interesting aspect of this credulous growth is that it is totally regulation-driven. Specifically, RCRA, Superfund, the Clean Air Act, and public attitudes are generating a business that was nil only decades ago. In 1977, the twelve segments in the Hazwaste industry totaled \$5.8 billion in sales. By 1989, this grew to \$35.9 billion. By 1993, this will total \$74.9 billion. It is expected that by the year 2000, the total Hazwaste sales will be \$121.2 billion. The distribution of growth and Hazwaste sales is shown in Figures 1 through 6.

Table 1. Projected Sales (Billions) in the Different Hazwaste Industry Sectors:
1977,1989,1993 and 2000 (XY) [10, 11]

Sector	Sales 1977	Sales 1988/89	Sales 1993	Sales 2000
Landfill	0.015	0.605	1.370	2.000
Hazardous Treatment	2.682	14.800	30.000	47.859
Wastewater Tr.	0.725	4.000	7.000	11.167
Waste to Energy	0.634	3.500	7.500	11.965
Air Pollution Ctl.	0.544	3.000	8.000	12.762
Thermal Incineration	0.362	2.000	5.000	7.977
Asbestos Abatement	0.453	2.500	6.000	9.572
"A, C & E"	0.005	0.700	1.400	3.500
Analytical testing	0.035	0.610	1.070	2.300
Recycling	0.181	1.000	2.500	3.988
Transportation	0.185	2.560	3.770	4.700
Site Remediation	0.000	0.654	1.290	3.400

THE HAZWASTE INDUSTRY 1977

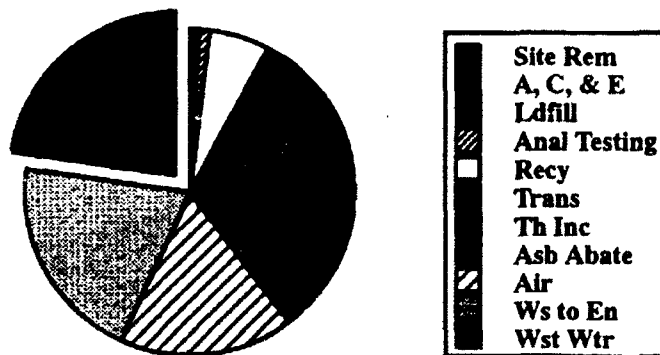
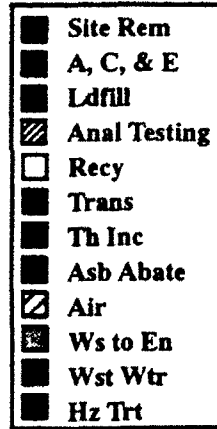
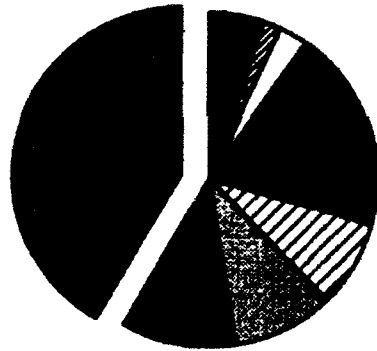


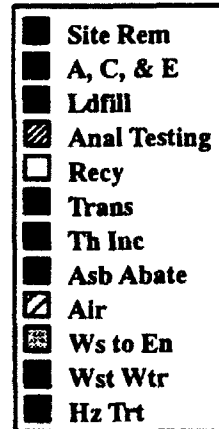
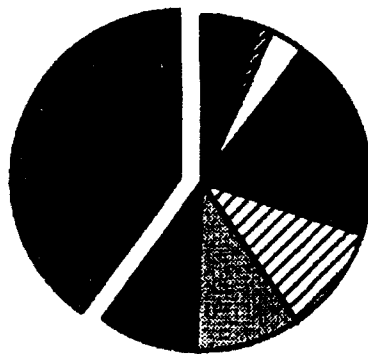
Figure 1. Apportionment of Sales in the Hazwaste Industry, 1977:
Total Sales: \$5.8 Billion.

THE HAZWASTE INDUSTRY 1989



*Figure 2. Apportionment of Sales in the Hazwaste Industry, 1989:
Total Sales: \$35.9 Billion.*

THE HAZWATER INDUSTRY 1993



*Figure 3. Apportionment of Sales in the Hazwaste Industry, 1993:
Total Sales: \$74.9 Billion.*

THE HAZWATER BUSINESS 2000

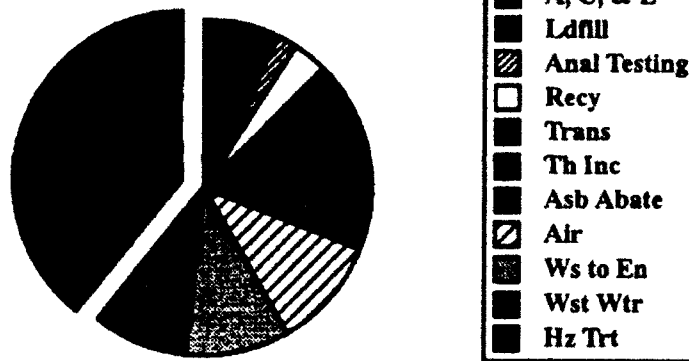


Figure 4. Apportionment of Sales in the Hazwaste Industry, 2000:
Total Sales: \$121.2 Billion.

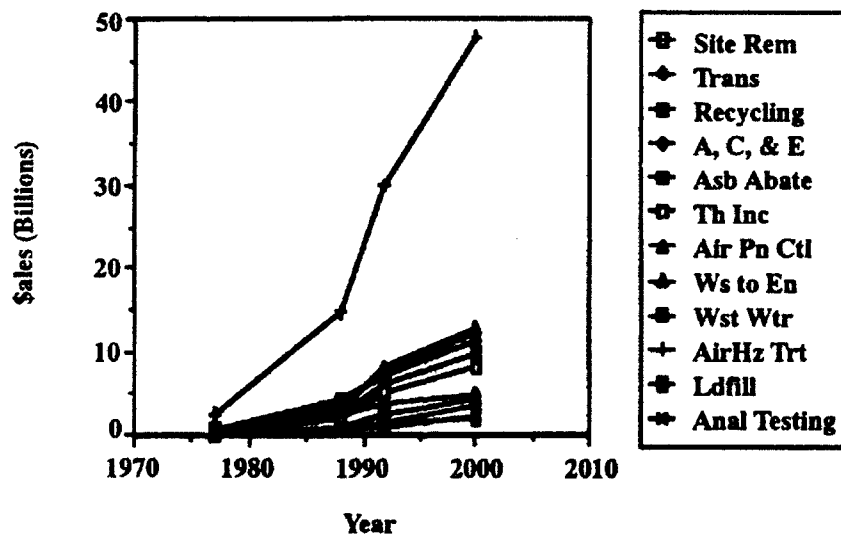


Figure 5. Growth of Sales in the Hazwaste Industry, 1977 to 2000.

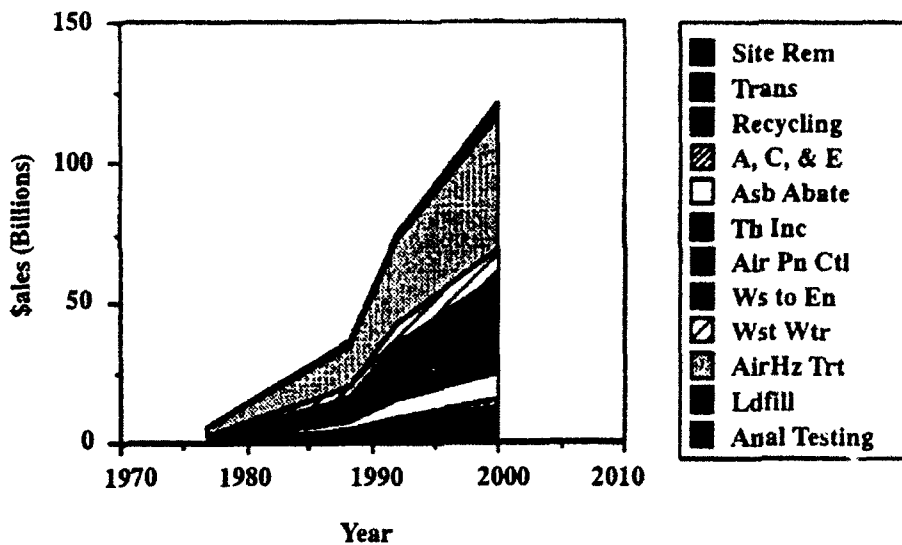


Figure 6. Cumulative Growth of Sales in the Hazwaste Industry, 1977 to 2000.

A number of environmental issues were passed in December [12, 13], (Table 3), and are likely to be enacted in the immediate future. The EPA is using a new hazard rating system [14] to determine which abandoned waste sites are the most dangerous. Also, EPA was forced by a federal appeals court [15] to review the definition of hazardous waste. In the future, it is expected that traditional low cost methods of direct landfilling, storage in surface impoundments, and deep-well injection will be replaced by waste minimization at the source of generation, waste recycling, physical/chemical/biological treatment, incineration, and chemical stabilization/solidification methods. Of all these, properly designed incineration systems are capable of the highest degree of overall destruction and control for the widest range of hazardous waste streams. Substantial design and operational experience already exist and a wide variety of well constructed commercial systems are available. Consequently, significant growth in the use of incineration and other thermal methods is anticipated.

Table 2. Additional Organics in Wastes to be Regulated As Hazardous

<u>Level</u>	<u>Regulatory Level</u> (mg per L)	<u>Regulatory</u> (mg per L)	
Benzene	0.50	Hexachlorobenzene	0.13
Carbon tetrachloride	0.50	Hexachlorobenzene-1,3-butadiene	0.50
Chlordane	0.03	Hexachloroethane	3.00
Chlorobenzene	100.00	Methyl ethyl ketone	200.00
Chloroform	6.00	Nitrobenzene	2.00
o-Cresol	200.00	Pentachlorophenol	100.00
m-Cresol	200.00	Pyridine	5.00
p-Cresol	200.00	Tetrachloroethylene	0.70
1,4-Dichlorobenzene	7.50	Trichloroethylene	0.50
1,2-Dichloroethane	0.50	2,4,5-Trichlorophenol	400.00
1,1-Dichloroethylene	0.70	2,4,6-Trichlorophenol	2.00
2,4-Dinitrotoluene	0.13	Vinyl chloride	0.20
Heptachlor	0.008		

Source: Environmental Protection Agency

Table 3. Environmental Issues on Capital Hill

<u>LEGISLATION</u>	<u>HOUSE COMMITTEE</u>	<u>SENATE COMMITTEE</u>	<u>OUTLOOK</u>
AIR. (H.R. 1066, S. 455): Establish program to reduce health threats posed by indoor air contaminants.	Education & Labor. Subcommittee on Health & Safety conducted hearings 7/31/91. Science, Space & Technology sent back to further consideration 8/1/91.	Environment & Public Works. Reported, amended 10/3/91. (S. Rept. 102-170).	Enactment possible.
ENVIRONMENT. (H.R. 67, S. 533): Establish a Department of the Environmental Statistics.		Environment & Public Works. Reported, amended 6/13/91. (S. Rept. 102-82).	Enactment likely.
WASTE. (H.R. 2194, S. 596): Require federal facilities to comply with federal and state environmental laws and regulations.	Energy & Commerce. Reported 6/13/91. (H. Rept. 102-111).	Environment & Public Works. Reported 5/30/91. (S. Rept. 10267).	Enactment likely.
(S. 976): Amend Resource Conservation & Recovery Act to require industrial generators of hazardous waste to file toxic use, and source reduction plans.	Energy & Commerce. Subcommittee on Transportation & Hazardous Materials continuing series of hearings begun 3/20/91. Science, Space & Technology Subcommittee on Environment held hearings 6/20/91.	Environment & Public Works. Subcommittee on Environmental Protection concluded hearings 9/17/91.	Enactment likely.
WATER. (S. 1081): Expanded EPA's authority to ban use of toxic pollutants, require it to update permit guidelines for specific industries at least every seven years.	Public Works & Transportation. Subcommittee on Water Resources concluded hearings 10/31/91.	Environment & Public Works. Subcommittee on Environmental Protection concluded hearings 7/18/91.	Enactment likely.

VII. LITIGATION/ACTIVITIES

Hazardous waste management was the environmental issue of the 1980s. Aging yuppies faced the problem of controlling pollution. This attitude is reflected in the strict regulations governing the handling of hazardous waste materials, the employee right-to-know (HAZCOM), chemical hygiene plan, and the community right-to-know. Some of this public concern arose over problems caused by past improper disposal of hazardous waste. There is a growing public resistance to increasing the number of landfills and to "out-of-state" use of existing landfills. This attitude, coupled with the philosophy of the Chemical Manufacturers Association which discourages the use of landfills, has resulted in a decline in the use of landfills and an increase in the use of incineration. There is also increased concern about the containment of spills, whether on the highways or in industry.

A. The Aberdeen Case

The following is a direct quotation:

Are you all set? Perhaps pushing age 50, with 20-25 years of successful government service behind you, in the upper reaches of federal employment, respected by your peers. Not a bad position to be in. And then a nightmare takes place. You are suddenly indicted, and convicted of a terrible crime, violating federal environmental laws. No damage is alleged to have occurred, no loss of life or property. You have committed no overt act, other than allowing chemicals previously used in your work to remain stored in a building without a permit.

Thus...you are convicted of failure to take action. There was no formal notification of wrong-doing from the federal government, as sometimes happens in environmental cases. No opportunity to reply or make amends. The first knowledge you have of any federal action occurs the day you are criminally indicted. At that point, you are face-to-face with a 5-year prison term and a \$250,000 fine. As if that isn't enough, the prosecuting attorney openly states that this case is sending a "message" to federal workers everywhere.

Even if you weren't caught up in this struggle, you may want to take notice... because it has all happened. If such a charge were brought against a corporation, the company would be indicted along with any individuals. But your agency can't be included. It is shielded by sovereign immunity and the fact that one part of the government is not authorized to bring action against another.

When your agency seeks to ameliorate your condition by participating or contributing to your defense, that option is denied by the government. Indeed, your lawyer is prevented from even mentioning some of these facts to the jury. All legal costs must come out of your pocket - the trial alone comes to \$65,000; any appeals could go far beyond that. Your life savings and perhaps your home are at risk, regardless of the outcome.

How many federal workers should be heeding this crystal-clear "message" that they are in jeopardy? It is difficult to say. The job sheet of the man actually convicted did not contain a word about environmental duties. Obviously, you have no protection there.

Some observers have estimated that 100,000 to 120,000 federal workers have specific environmental responsibilities. But the Office of Personnel Management is unable to confirm or deny the figures.

Remember, this situation should not be confused with the so called 'tort claims' legislation. Tort claims involve civil suits under common law, which may be brought against

federal workers who are alleged to have committed wrongs. They are usually initiated by aggrieved parties. As long as you are doing your job, you have relatively good protection under the tort claims legislation. The government normally handles your defense.

But this case is completely different. It is a criminal indictment under the Resource Conservation and Recovery Act of 1976. You are personally liable. It is no defense that you are doing your job, or that your job sheet does not give you any environmental responsibilities.

In the case at issue, a member of the Senior Executive Service (ES-4) with a brilliant record, was convicted on one count. It stated that he knowingly caused hazardous waste that had been used in his work 'to be stored and disposed of' without a permit during the period from 1983 to 1986.

The building in which this occurred was closed in 1978 and all personnel were transferred 'to other areas.' It remained unused since that time. Obtaining the permit was the responsibility of the installation, which had its own environmental affairs staff, but some facts could not be brought up at the trial. This restriction stemmed from a motion by the prosecuting attorneys.

For example, the defense was precluded from mentioning that the parent agency had not been indicted. The prosecution said:

'Allowing the defense to raise the issue of whether the United States could have or should have indicted others will only result in considerable jury confusion and is absolutely impermissible.'

The judge agreed, defense was instructed not to bring it up when addressing the jury or during the course of the trial. The prosecuting attorneys also did not want the defense to be able to argue that there had been hazardous waste violations committed by others at the installation. The defendants 'must be restricted' from stating such facts.

In addition, it was argued that the defense 'should be precluded from mentioning' in their opening statement or during cross-examination that installation authorities and others up the chain failed to obtain contractors to remove their waste.

One other item to keep in mind. Ignorance of the law is no defense. The prosecuting attorneys wanted the defense to be prevented from even mentioning before the jury that defendants did not know certain wastes were regulated by the RCRA. They continued:

'If the defense is allowed to raise the alleged ignorance in opening statements, the jury will certainly be confused about the defendants' responsibilities under RCRA and the subsequent unfair prejudice to the government may not be cured by the Court's instruction on ignorance of the law at the close of the case. The proper issue for the jury's consideration is whether the defendants stored, treated, or disposed of hazardous wastes in violation of RCRA, not whether the defendants knew about RCRA.'

This is worth thinking about. Regardless of whether you are familiar with environmental laws or whether your job sheet mentions them, you can be criminally liable for a violation. And you may be restricted from bringing up certain facts you consider relevant at the trial.

You would be well advised to keep this situation in mind, if you, or others reporting to you, are involved in such matters. It may require a special effort to stay current on the environmental situation.

An attempt was made by the defense to have the case dismissed because:

- a. Defendants are protected from this criminal prosecution on the grounds of sovereign immunity.*
- b. The indictment fails to show the defendants are 'persons' who can be prosecuted under the act.*
- c. The constitution prohibits the U.S. attorney from prosecuting since the violations allegedly 'occurred on a federal enclave over which Congress exercises exclusive jurisdiction.'*

This entire motion was unsuccessful – rejected by both the District Court and the U.S. Court of Appeals. It was labeled 'ludicrous' and 'ridiculous' by the prosecutors.

The violation occurred at Aberdeen Proving Ground, Maryland, an Army installation. Two other defendants were also convicted, one a GS-15 engineer, the other a GS-14 manager. They face even heavier penalties, \$750,000 each in fines and up to 15 years in prison. Sentencing of all three is scheduled for May.

Interest in this case within official Washington is difficult to come by. No central executive organization or legislative committee has been identified that is greatly concerned about its potential impact on federal workers. They may not have received the message.

But one thing should be fairly clear. Do not take environmental matters lightly. The government has made them one of your most vital responsibilities, no matter what your job is.

Various installations mentioned as potentially facing similar problems include Agriculture Department laboratories, Defense and Energy Department weapons facilities, federal prisons using solvents, and Veterans Administration hospitals with medical wastes. But there are at least ten additional federal environmental laws with criminal penalties, including those governing air, water, ocean dumping wetlands, toxic substances, and pesticides.

You are in the best position to judge your exposure. The Environmental Protection Agency emphasizes one final point ... supervisors should be especially careful [16].

B. Activities

The Hazwaste industry is impacted by political activities. Even the elections cause a change in growth. The President talked tough on environmental issues during his campaign, although some of his recent legislation is viewed as weak. President George Bush has received a detailed report [15, 17] on what is wrong with the Superfund program and how to fix it. The hazardous waste sites' cleanup is not being managed properly. Cleanups were originally expected to average \$9 million but are actually running between \$21–30 million. There are currently 1,175 high-priority sites. This is a lucrative potential market.

In the future, a change in parties could result in a shift of governmental priorities. Republicans favor a free market economy, but are pressing to balance the budget via Gramm–Rudmann guidelines. The Democrats favor market intervention, but also might favor social programs versus environmental cleanup in the event of a tightened budget. A change in party could at least slow EPA's already sluggish enforcement, as agencies and priorities change hands. It is likely that the Democrats will at least campaign hard line on environmental issues in the next election. If defense spending also is lowered, this could slow the cleanup of DoE and DoD sites.

One very critical issue in this industry surrounds the use of landfills [11]. The scope of materials governed by RCRA is widening, while the number of commercial land disposal facilities is dwindling. Additionally, there are land bans limiting the use of landfills for hazardous materials. The final and most serious of the three land bans went into effect in May 1990. This could lead to a serious capacity crunch which must be picked up by more expensive incineration. This is serious since public resistance to new landfills and incineration is quite high. Disposal costs are rising with the shutdown of landfills, the land restriction bans and the lack of permitting new facilities. More landfills are being taken out of service than are being replaced. Prices for land disposal have increased four- to eight-fold during the past five years. More increases are expected. State regulatory barriers against the import of waste from some other states are being erected. Some states, specifically South Carolina and Alabama, have put up barriers against receiving waste from states that do not have their own treatment or disposal capacity. In July, the governor of South Carolina issued a strict executive order limiting land disposal of out-of-state waste to 35,000 tons/year for each state. Another critical issue [18] for the states is the fact that in the future, the states will bear a growing share of environmental cleanup cost. Most states are hard pressed to meet the expense of existing programs. Between now and the year 2000, the cost of environmental protection will grow almost \$21 billion in real terms; state and local governments will bear the bulk of that burden.

The House of Representatives crafted legislation which will ensure the safety of hazardous material transportation [19, 20] in the U.S. and provide funds for enhanced training of emergency response teams. Why the concern? More than 1.5 billion tons of gasoline, chemicals, explosives, and hazardous wastes are transported across the U.S. annually. It is estimated that more than 250,000 shipments of hazardous materials are made on the nation's highways, railways, and waterways. Some consider this situation a Bhopal on wheels! More information is needed on what is being transported and what to do in an emergency.

In the period from 1988 to 1990, the New Jersey State Highway Patrol inspected 8,700 trucks carrying hazardous wastes; 36 percent were not permitted to continue. There is a need for better enforcement of hazardous materials transportation laws, safe routing of hazardous material, proper training of enforcers and transporters, and funds for training. At the state level, the Chemical Manufacturers Association desires national uniformity. Conflicting state laws could make compliance difficult. The Department of Transportation should decide the legal issues, leaving it to the states to identify the routes.

Internationally [20-23], with respect to environmental activities, the world is getting smaller and smaller. International environmental activity is in a new age of sophistication. Between 1972 and 1985 more than 120 countries added environmental oversight functions. International activities focus on environmental protection/economic development, transboundary pollution, global environmental phenomena, and industrial emergencies. Some developing countries, for example Brazil, have aggressive environmental programs. Among industrialized countries, hazardous waste management, chemical risk management, and transboundary air and water pollution are major issues. A major challenge lies ahead. The existence of environmental laws and agreements does not guarantee their enforcement.

In the past year, manufacturers generated more than 290 million tons of hazardous waste regulated under RCRA. Less than five percent was solid waste; the remainder was wastewater. Industry is well aware of the volume of waste and of the high costs of trying to comply with the laws. As a result, many companies are making major efforts, often begun years ago, but taking on new meaning recently, to try to reduce that amount of waste.

C. More Recent Decisions

In the case of the U.S. versus Jude, D.C. SWVa., No. 3:88-00226 (August 14, 1989), Harrison Jude, the President of Kermit Lumber and Pressure Treating Co., a West Virginia-based company that uses chemical solutions with arsenic content to treat lumber, was convicted under RCRA. He was given a two-year suspended prison term and ordered to pay a \$75,000 fine. The government charged that both Jude, a responsible corporate officer, and the company, knowingly stored and disposed of arsenic-laden sediments and residues without obtaining the proper permits.

In the case of the U.S. versus McKiel, D.C. Mass, Cr. No. 89-24-N, (June 29, 1989), two corporate officials were sentenced to jail terms for both violation of the Clean Water Act by discharge of electroplating process waste into the local river and sewer system, and for violation of RCRA by storing hazardous electroplating waste at the facility for more than 90 days. Robert McKiel, the president, was sentenced to one year in prison and was ordered to serve four months of the term. Scott McKiel, the vice president, was sentenced to nine months and was ordered to serve three months of the term.

The case of the U.S. versus Sanders, D.C. MDAla. (1989) concerns some litigation at the local level. At the request of the EPA, the U.S. Attorney filed against Sanders Lead Co., seeking injunctive relief and civil penalties under RCRA. Sanders is a Troy, Alabama-based company which runs a lead smelter and lead battery recycling facility which treats, stores, and disposes of its own hazardous waste. Sanders was charged with disposing of waste which contained toxic heavy metals such as lead, cadmium, arsenic, and chromium in any of eight of the company's own land disposal units. In November 1985, Sanders lost its interim permit status by failure to comply with the groundwater monitoring and financial responsibility requirements. Allegedly, Sanders, after losing its interim status, continued to treat, store and dispose of hazardous waste at its facility. This suit involves \$25,000 per day in penalties on each of the eight disposal units, extending over a three-year period.

In a suit against Lexington Fabrics, the Alabama Attorney General recently settled for alleged violations of its water discharge permits. The suit included 400 violations which occurred from 1985 through 1988. The settlement resulted in \$43,500 in fines and a reduction in the amount of solids it discharges from its plant.

In another Alabama case [24], a toxic-dump suit is being appealed. Chemical Waste Management contends that an Alabama law violates interstate commerce by blocking the shipment of hazardous waste to the company's west Alabama landfill at Emelle, Alabama. Chemical Waste operates the largest commercial hazardous waste landfill at Emelle. The suit also seeks to overturn a state environmental regulation which requires that the hazardous waste from Superfund sites must meet the same pretreatment standards as other commercial wastes. Alabama Departmental and Environmental Management (ADEM) also requires notification and approval prior to shipment of the materials. Chemical Waste claims that the cumulative effect of the three rulings is to block interstate commerce.

VIII. CONCLUSIONS

From this review, it is clear that current MICOM regulations representatively impose hazardous waste management as required by RCRA. In fact, the MICOM regulations are founded on RCRA. The Army is enforcing these regulations.

The Aberdeen case was unfortunate for the civil service workforce, particularly, the managers. With the heavy personal liability being imposed on managers for both environmental and HAZCOM violations, who can afford it? There is a very real need for continual education of the workforce who for several centuries have been immune from this type of charge.

From the view of a supervisor and a chemist, we are faced with at least three very large bodies of regulation, all dealing with the same issues but different standards. For example, if we have a hazardous chemical in the laboratory, we use HAZCOM labels, names and codes. If we wish to ship that chemical, it then falls under DoT rules, which may change its name and does change its label and codes. Finally, when you wish to get rid of the chemical, it becomes hazardous waste and falls under RCRA with another set of names, labels and codes. This is unnecessary. It is all the same thing and should be governed in a uniform manner. We have a long, long way to go before this question is settled.

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